DOCUMENT RESUME

ED 314 171 PS 018 480

TITLE Development of Height, Weight and Body Mass in Infants from Birth to Age Seven. Report #89-1.
INSTITUTION Missouri Univ., St. Louis. Parents as Teachers National Center.
PUB DATE 89
NOTE 34p.; For related documents, see PS 018 481-482. Figures and one table will not reproduce legibly.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Age Differences; Blacks; *Body Height; *Body Weight; Comparative Analysis; Infants; Longitudinal Studies; Lower Class; *Physical Development; *Racial Differences; *Sex Differences; Toddlers; *Young Children

ABSTRACT

This paper presents normative data on height, weight, and body mass in a birth cohort studied prospectively from birth to the age of 7 years. Data are presented by gender and race. The cohort was meant to be representative of the St. Louis metropolitan area in that it included poor people's children, and especially black children who had rarely been included in prospective birth cohorts. Oversampling of black and lower class probands was used to offset the predictable attrition from the milieu. Comparisons with National Center for Health Statistics (1977) and Philadelphia (Verghese and others, 1969) data are made. Reported findings concern weight, height, weight increment, height increment, and ponderal index. It is concluded that development of norms by race seems appropriate and that the data of this report tend to confirm their value. (RH)

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PARENTS AS TEACHERS NATIONAL CENTER

Development Of Height, Weight And Body Mass In Infants From Birth To Age Seven

REPORT SERIES

University of Missouri St. Louis

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Report #89-1: Development Of Height, Weight And Body Mass In Infants From Birth To Age Seven

ABSTRACT

Normative data on height, weight and body mass in a birth cohort studied prospectively to age seven years are presented. Data are presented by gender and by race. Comparisons are made with NCHS (1977) and Philadelphia (Verghese et alii, 1969) data.

Report #89-1: Development Of Height, Weight and Body Mass In Infants From Birth to Age Seven

INTRODUCTION

The Parents as Teachers program intends to advance the welfare of children through effective parenting and nurture. A fundamental aspect is the maintenance of physical development along normatively sound lines. Monitoring this componet of growth by parent educators and other specialists require an appreciation of what constitutes normal height and weight at any given age. This report draws on data from a research program of the University of Missouri-St. Louis (Jordan, 1981).

Height and weight data are reported at nine intervals beginning in the delivery room and ending, for the purposes of this report, at age seven. Measuring procedures were checked regularly by a supervising caseworker in order to address reliability of measurements across casewrokers and within the series of measurements taken by individual caseworkers.

Cohort. The cohort was meant to be representative of the St. Louis metropolitan area in the sense of including poor people's children, especially black children who have rarely been included in prospective birth cohorts. Oversampling of black and lower class probands was used to offset attrition predictable from the millieu. However, obtaining parent cooperation was not a problem from six months to age

seven when funding problems mandated a change in procedures to the detriment of retaining lower class children, black and white. At age six months some lower class children had disappeared, others were not available, and tracing procedures had yet to evolve to the level of effectiveness they reached in later years. The sample sizes in Table 1 show that tracing grew in effectiveness and reached its peak at 48 months; for the fifth year, 48 plus 54 months, the total number of children contacted reached 825. The data we report here are for all traced children to age two, but for one half of the probands beginning at age three. At that age the cohort was split into two groups in order to allow more intensive tracing. Mobility among poor families was high, and only by halving the number of children to be located annually, given a fixed number of caseworkers, could the necessary degree of intensive searching be pursued. We point out that the result was location and measurement of lower class children in a population moving as frequently as once a month in a given year. In other instances the writer insisted that caseworkers not enter homes where the risk of assault was high, so that probands were dropped rather than lost. In prospective longitudinal study samples have, historically, been middle class and white, a restriction the sampling frames sought to avoid. In Table 1 may be found the number of cases

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INSERT TABLE 1 ABOUT HERE

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at each of the ages reported from whom weight and height were gathered. The sample numbers after age three tended to be quite consistent because there was a heterogeneous core of children from whom data-taking was arranged annually with great success.

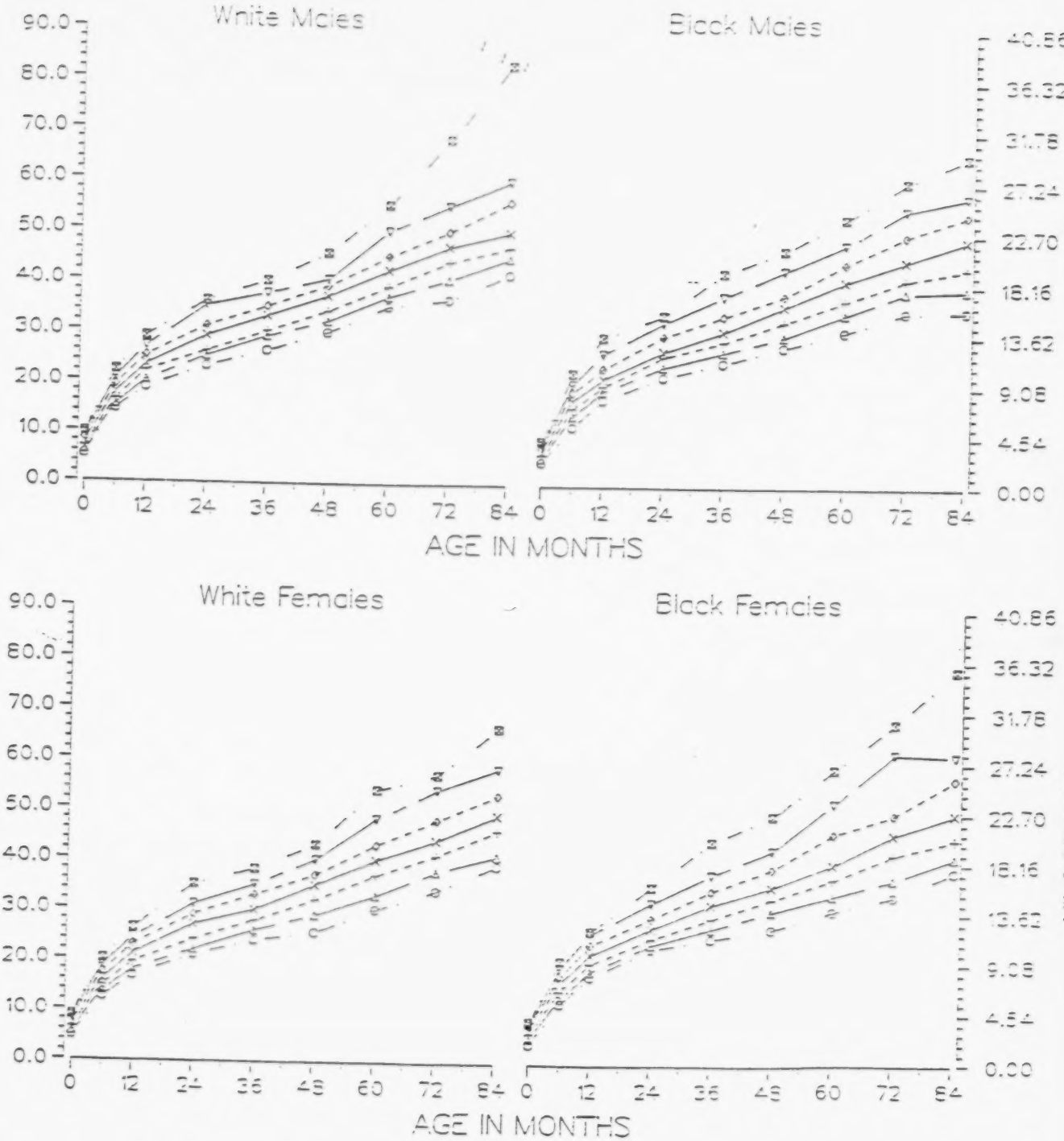
TABLE 1

SAMPLE SIZE AT AGES BIRTH TO 84 MONTHS

			Birth	6 Mos	12 Mos	24 Mos	36 Mos	48 Mos	60 Mos	72 Mos	84 Mos
Weight	M	B	227	148	84	154	92	102	105	98	47
		W	276	211	277	231	104	116	116	114	186
	F	B	224	155	76	127	73	94	86	79	51
		W	251	179	190	201	99	105	107	107	83
			978	693	627	713	368	417	414	405	367
Height	M	B	211	84	84	154	92	102	105	98	47
		W	211	167	218	231	108	117	116	114	186
	F	B	225	150	73	127	73	94	86	79	51
		W	225	137	183	201	103	101	107	107	83
			872	538	558	713	376	414	414	398	367

Figure 1

WEIGHTS FROM BIRTH TO SEVEN YEARS



RESULTS

Weight. In Figure 1 are four graphs recording mean weights for the probands at nine time points using the internationally recognized points in distributions from the third to the ninety seventh percentiles. The mean height for all four groups of children at birth was 6.97 lb. with a standard deviation of 1.32 lb. across the parameters of sex and race. The range of birth weights from high to low was 12.00 lb. to 1.9 lb. The distributions

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INSERT FIGURE 1 ABOUT HERE

---

of all four percentile points in Figure I are comparable; the 97th percentile in weight for all four groups of children shows a mild depression, comparatively speaking, at 24 months, and the 90th percentile line shows a flattening at age seven years also evident in the 3rd and 10th percentile lines.

INSERT TABLE 2 ABOUT HERE

The 50th percentile in weight for the four groups of children is shown in Table 2. There we see the values expressed in kilograms to observe the international convention. At birth the order of weights is that white females were heaviest, followed by white males, black males and black females; the range of birth weights at the 50th percentile is 1.14 lb. (.52 kg.). At six months, white females and males are followed by black females and males; the range of mid-distribution weights was .79 lb. (.36 kg.) At twelve months white males are heaviest followed by black males, black females and white females; the range of mid-series weights is 2.42 lb. (1.96 kg.). On the second birthday white male's average weights are heaviest

TABLE 2

COMPARISON OF 10TH TO 90 PERCENTILE VALUES FOR HEIGHT AND WEIGHT FROM ST. LOUIS BABY STUDY AND HCHS (Hamill et alii, 1977) DATA

Age	Height (cm.)						Weight (kg.)					
	Male			Female			Male			Female		
	White	HCHS	Black	White	HCHS	Black	White	HCHS	Black	White	HCHS	Black
Birth	50.80	-	48.26	49.27	-	47.77	3.44	3.40	3.01	3.55	3.25	3.30
6 Mos.	66.87	-	66.54	64.51	-	65.27	7.96	7.82	7.69	8.00	7.20	8.05
12 Mos.	75.94	-	74.42	72.64	-	73.40	11.50	10.10	9.54	10.55	9.57	10.90
24 Mos.	87.12	85.60	94.99	85.34	87.20	83.56	14.15	12.57	13.45	13.05	11.97	13.15
36 Mos.	97.02	95.40	103.37	94.48	94.50	96.26	16.45	14.61	15.45	14.90	13.95	15.80
48 Mos.	104.88	102.30	106.17	101.60	101.80	104.14	18.25	16.55	18.00	17.30	15.99	17.65
60 Mos.	110.99	109.30	112.77	107.44	108.50	111.25	21.00	18.70	20.35	19.85	17.90	19.95
72 Mos.	117.34	116.10	116.84	116.07	115.10	118.11	23.05	20.84	22.40	22.90	20.12	20.61
84 Mos.	122.42	122.40	121.66	121.66	121.30	119.08	24.90	23.54	24.45	24.45	22.49	22.00

followed by black males, black females and white females; the range is 2.42 lb. (1.10 kg.). On the third birthday, the order of weights is white males, black females, black males and white females; the range is 2.20 lb. (1 kg.). On the fourth birthday the order of weights was white males, black females, black males and white females; the range is 2.31 lb. (1.05 kg.). The sequence at age five years is males, white and black, followed by females black and white; the range of average weights is 2.53 lb. (1.15 kg.). At age six the order is white males, but females both black and white were in second place with identical weights and black males are lightest; the range of average weights is 5.37 lb. (2.44 kg.). Finally, at age seven white males are heaviest, followed by black males and white females at identical weights, with black females having the lowest weights; the range is 6.38 lb. (2.90 kg.). Summarizing these results we see that white males were consistently heaviest, without exception, and females tended to be the lightest, especially between ages twenty four months and six years. When compared with NCHS 1977 norms (Hammill et alii, 1977), white children generally exceeded norms and black children fell below them.

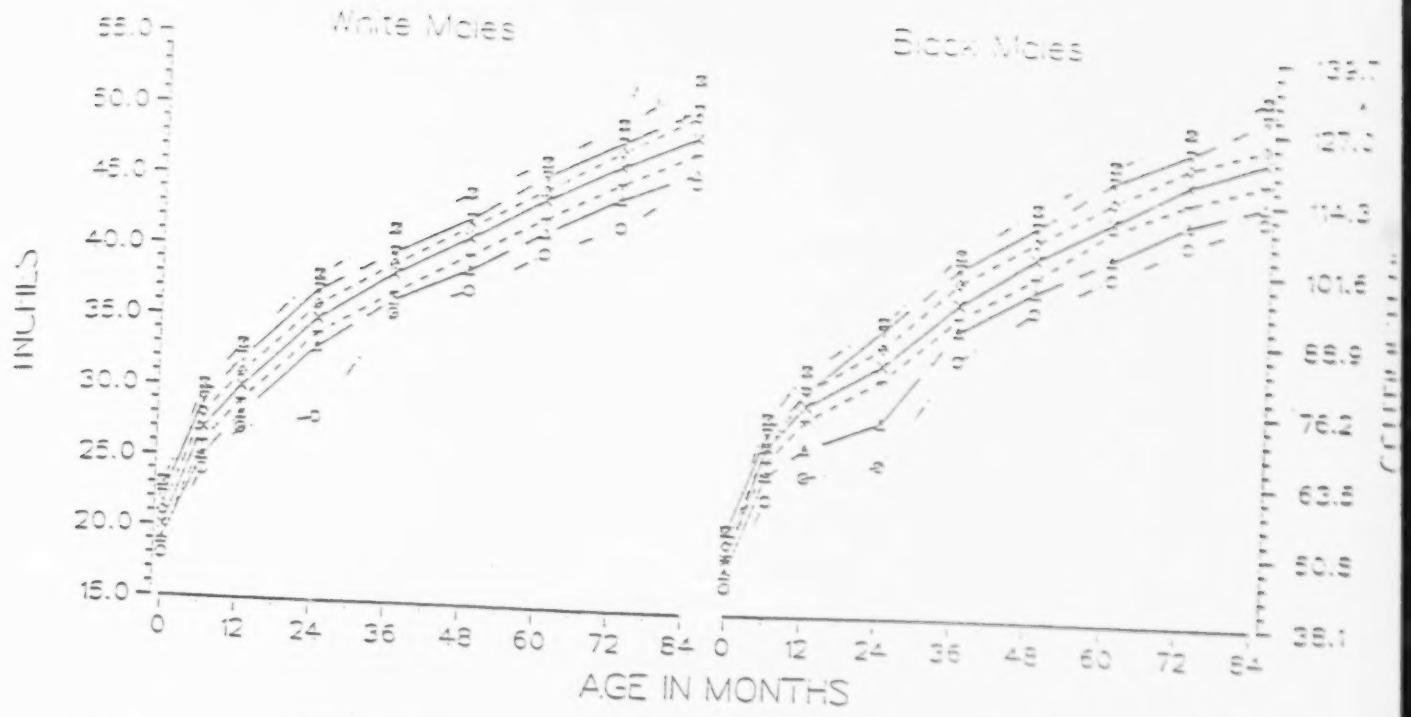
Height. In Figure 2 are four graphs showing the lengths of infants at birth, six and twelve months, and standing heights without shoes at subsequent ages. The birth lengths were calculated by delivery room personnel and the other measurements, like height, were taken in the home on the birthday. As the children grew older and birthday parties more exuberant some visits by caseworkers came a day or so before or after the big day.

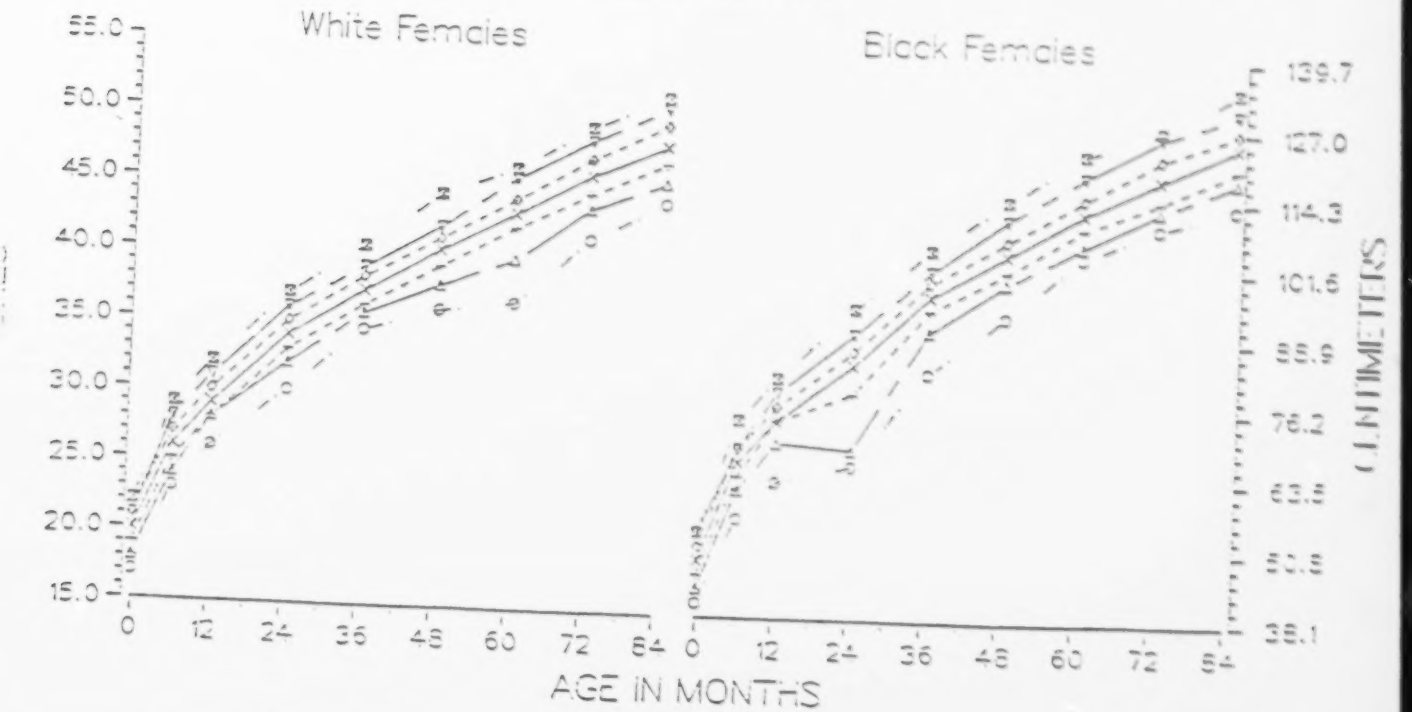
INSERT FIGURE 2 ABOUT HERE

Height lines for the four groups of children tend to be similar at the

Figure 2

HEIGHTS FROM BIRTH TO SEVEN YEARS





- 3rd Percentile
- 10th Percentile
- 25th Percentile
- 50th Percentile
- 75th Percentile
- 90th Percentile
- 97th Percentile

conventional 3rd - 97th percentile periods; an initially large increment is followed by a shift to a diagonal, steady increment over the years. As an accident of sampling there are occasional depressions in the lines joining percentile points at each of nine ages.

Consideration of Table 2 permits some comments based on the 50th percentile values. The mean birth length was 19.61 in. (49.80 cm.), and the standard deviation was 1.41 in. for all newborns. At birth white males were the longest with an average length of twenty inches (50.80 cm.); shorter babies in order of descent were white females, black males and black females; the range is 1.20 in. (3.07 cm.) at the 50th percentile amongst newborns.

At six months the babies had grown an average of six inches; white males were longest, followed by black males, black females, and white females; the range was .93 in. (2.36 cm.). Six months later they were longer, or taller if walking, by another three inches. White males were the tallest of the four groups followed in descending order by white females, black males and black females; the range of average heights was one inch (2.54 cm.). On the second birthday the mean height for all subjects was 33.65 in. (85.47 cm.). For this quite large group, certainly larger than the subsequent birthday groups because of the change of sampling strategy for subsequent data taking, the tallest were black males followed by white males, black females and white females; the range was 1.40 in. (3.56 cm.). At age three the average child was 37.85 in. (96.13 cm.) and the standard deviation was 1.91 in. Black males were followed in height by white males, black females and white females; the range of average heights was 3.5 in. (8.89 cm.). At four the average child stood 40.64 in. (103.22 cm.) and the standard deviation was 1.92 in. Black males were tallest, and black females

came next, followed by white males and females; the range of averages was .79 in. (2.03 cm.). Amongst the five year olds the mean height was 43.47 (110.41 cm.) with a standard deviation of 2.02 in. Black males were tallest followed by black females and white males and white females; the range was 2.09 in. (5.33 cm.). At age six years the average child stood 46.13 in. (117.17 cm.) and the standard deviation was 1.89. White females were tallest followed by white males, black males, and white females. At age seven years we report the ninth and final of our consecutive measures. White males were tallest and were followed by black males and white females of identical weight and by black females. The difference at this ninth age between the highest and lowest 50th percentile values was one inch (2.54 cm.). In comparison with NCHS 1977 norms, white and black males and black females uniformly exceeded them, and white females generally meet them.

Weight Increment. The value of longitudinal data is that they give a picture of growth over time. In Table 3 may be found the median annual increments in weight and height for the four groups of children calculated by subtracting the 50th percentile at each age from the value at the next age in the manner suggested by Cameron (1984). Weight increments in lb. after the first year reached 6.10 lb. between ages six and seven in white females.

INSERT TABLE 3 AND 4 ABOUT HERE

The lowest annual increment was 3.10 lb. which may be found at several points in Table 3. Within the four groups of children, after the first years, the largest increment in lb. is found inconsistently. Among white males it is 5.50 lb. in the fifth year (48-60 Mos.). In black males it is 5.70 lb. in the third year. In white females it is 6.10 lb. in the sixth

TABLE 3

MEAN ANNUAL INCREMENTS IN WEIGHT OF MALES WITH[1] AND WITHOUT[2] RACE

Age	Cohort							
	White		Black		Race Unspecified[1]		Black Children[2]	
	lb.	kg.	lb.	kg.	lb.	kg.	lb.	kg.
Birth	15.35	6.90	14.45	6.50	15.40	6.93		
12 Mos.	5.30	2.38	4.10	1.84	5.00	2.25	8.14	3.70
24 Mos.	4.60	2.07	5.70	2.56	4.00	1.80	2.42	1.10
36 Mos.	3.60	1.62	4.00	1.80	5.00	2.75	5.72	2.60
48 Mos.	5.50	2.47	4.70	2.11	5.00	2.25	5.06	2.30
60 Mos.	4.10	1.84	4.10	1.84	5.00	2.25	3.74	1.70
72 Mos.	3.70	1.66	4.10	1.84	7.00	3.15	3.08	1.40
84 Mos.								

[1]Krogman, 1972
[2]Verghese et alii, 1969

TABLE 4

MEAN ANNUAL INCREMENTS IN WEIGHT OF FEMALES WITH [1] AND WITHOUT [2] RACE

Age	Cohort							
	White		Black		Race Unspecified[1]		Black Children[2]	
	lb.	kg.	lb.	kg.	lb.	kg.	lb.	kg.
Birth	14.00	6.30	15.10	6.79	14.10	6.34		
12 Mos.	5.00	2.25	4.50	2.02	5.40	2.43	4.62	2.10
24 Mos.	3.70	1.66	4.90	2.20	4.00	1.80	5.94	2.70
36 Mos.	4.80	2.16	3.70	1.66	5.00	2.25	3.74	1.70
48 Mos.	5.10	2.29	4.60	2.07	5.00	2.25	6.82	3.10
60 Mos.	6.10	2.74	5.90	2.65	4.00	1.80	2.86	1.30
72 Mos.	3.10	1.39	3.10	1.39	5.00	2.25	7.26	3.30
84 Mos.								

[1] Krogman, 1972
[2] Verghese et alii, 1969

year, and in black females it is 5.90 lb. also in the sixth year. In girls there is consistency, but not in boys. The two female increments are quite similar being only .20 lb. apart.

Height Increment. After the initial spurt of the first year the greatest male increment in height was 5.60 in. (14.22 cm.) experienced in their second year. For all but black girls the second year was the year of greatest increment; black females experienced their greatest increment in their third year. The lowest annual increment in height in Table 4 is .70 in. by black girls between their sixth and seventh birthdays.

INSERT TABLE 5 AND 6 ABOUT HERE

Ponderal Index. Height and weight are useful parameters of development which can be combined into an index of body mass by means of Quetelet's nineteenth century formula h/w^2. Recently reviewed by Lasker and Mascie-Taylor (1989), this body mass index seemed influenced by low social class membership in the 1958 British birth cohort. Previously, Newens and Goldstein (1972) reviewed several indices and found none especially distinctive. In Table 7 are ponderal indexes calculated from the mid-distribution values in Table 2. There, we see a consistent pattern of falling indexes from birth in four groups of Baby Study probands, plus indexes calculated for comparative purposes from the NCHS (1977) norms alluded to earlier. In general h/w^2 indexes decline from about 4.0 at birth to about .20 at age seven years. The consistently declining body mass indexes describes the changes in shape as infants lose fat and grow into the lean somatype we associate with childhood. The changes before and after age two years are quite different, and the declines in the index numbers are comparatively mild

TABLE 5

MEAN ANNUAL INCREMENTS IN HEIGHT OF MALES WITH[1] AND WITHOUT[2] RACE

Age	Cohort							
	White		Black		Race Unspecified[1]		Black Children[2]	
	in.	cm.	in.	cm.	in.	cm.	in.	cm.
Birth								
	9.90	25.14	10.30	26.16	9.60	24.38		
12 Mos.								
	4.40	11.17	5.60	14.22	4.80	12.19	3.06	6.80
24 Mos.								
	3.90	9.90	3.30	8.38	3.30	8.38	4.14	9.20
36 Mos.								
	2.70	6.85	1.10	2.79	3.00	7.62	3.64	8.10
48 Mos.								
	2.80	7.11	2.60	6.60	2.90	7.36	3.28	7.30
60 Mos.								
	2.50	6.35	2.00	5.08	2.40	6.09	2.20	4.90
72 Mos.								
	2.20	5.58	1.90	4.82	2.10	5.33	2.65	5.90
84 Mos.								

[1]Krogman, 1972
[2]Verghese et alii, 1969

TABLE 6

MEAN ANNUAL INCREMENTS IN HEIGHT OF FEMALES WITH[1] AND WITHOUT[2] RACE

Age	Cohort							
	White		Black		Race Unspecified[1]		Black Children[2]	
	in.	cm.	in.	cm.	in.	cm.	in.	cm.
Birth	9.20	23.36	10.10	25.65	9.50	24.25		
12 Mos.	5.00	12.70	4.00	10.16	4.80	12.19	4.70	10.40
24 Mos.	3.60	9.14	5.00	12.70	3.40	8.63	3.64	8.10
36 Mos.	2.80	7.11	3.10	7.87	3.10	7.87	3.19	7.10
48 Mos.	2.30	5.84	2.80	7.11	3.20	8.12	3.06	6.80
60 Mos.	3.40	8.63	2.70	6.85	1.90	4.82	2.29	5.10
72 Mos.	2.20	5.58	.70	1.77	2.20	5.58	3.69	8.20
84 Mos.								

[1]Krogman, 1972
[2]Verghese et alii, 1969

from two to seven. The drop across the five years is about one half - from about .5 to .2. At each of nine ages the h/w^2 values of the four subgroups of children are generally comparable. When appraised against the Hammill et aliorum (1977) values, both males and females fall below NCHS

INSERT TABLE 7 ABOUT HERE

norms; in no instance do the Baby Study subgroup indexes reach or exceed the values calculated from the NCHS numbers.

DISCUSSION

The essential value of the data reported here lies in several characteristics. Norms based on children in the preschool years are not common (Berkeley, Reed and Valadian (1983). In these data from the St. Louis Baby Study, race is explicitly recognized, a proposition set forth by Eveleth (1979), and by Eveleth and Tanner (1966). Race is not used, for example, in Cameron's (1977) large sample of inner London school districts whose racial heterogeneity has been evident for decades. The norms established apply to a particular community, responding to Goldstein and Tanner's (1980) observation that growth has an ecology and occurs in a specific habitat. In that respect the data conform to the practice of specifying location of population narrowly; e.g. in the work of Demirjian, Jenick and Dubuc (1972). The norms arise from repeated measurement of a single cohort and are calculated at each birthday according to international convention from the third to the ninety seventh percentile. All measurements were taken to the quarter inch and quarter pound.

On the other hand, there are some limitations in presenting only height and weight. The number of points on the human body for which norms are

TABLE 7

BODY MASS INDEX (h/w^2) OF BLACK AND WHITE MALES AND FEMALES AT NINE AGES

	Males			Females		
Age	White	NCHS	Black	White	NCHS	Black
Birth	4.29		4.17	3.91		4.82
6 Mos.	1.05		1.12	1.01		1.01
12 Mos.	.57		.82	.64		.62
24 Mos.	.43	.54	.52	.50	.61	.48
36 Mos.	.36	.44	.43	.42	.42	.38
48 Mos.	.31	.37	.33	.34	.40	.33
60 Mos.	.25	.31	.27	.27	.39	.28
72 Mos.	.22	.27	.23	.22	.28	.28
84 Mos.	.20	.22	.20	.20	.24	.25

available go well beyond height and weight. Pryor (1966) has presented percentiles for bi-iliac width, face, ear, trunk, and sitting height, in addition to height and weight. Also, our size for samples when broken down by race and sex declines by one half; occasionally in the diagrams for height particular curves are upset by outlaying values.

In all data sets there are points of vulnerability. Height and weight, however precisely measured at a given moment, are not stable, or *reliable* in psychometric terms. We have known since the eighteenth century that height fluctuates in a circadian manner (Wasse, 1724). Weight also fluctuates with exercise and with elimination or intake; Martin (1954) has reported a fluctuation of 1.5 lb. over six hours in the weight of a three-year old child. Also, norms can be tyrannical and inappropriate; that is, genetic endowment influences growth patterns (Garn et alii, 1960), and only a few studies have used parental weight or height as a covariate (Tanner, Goldstein, and Whitehouse, 1970) when calculating norms for children. Of course, the relevance of covariates depends on the specific trait being assessed (Tanner and Israelsohn, 1963). There is the unavoidable limitation that any sample represents a specific date, and the secular trend in physical growth has not yet declined completely (Sady, Moffatt and Owen, 1981).

Review of Figures 1 and 2 shows that growth in height and weight is generally uniform in the sense that age/measure points when connected are generally parallel. Of course, we are not dealing with a 'pure' data set, one in which all measures are available for all children at all ages. In field-based prospective research such artificial tidiness is not frequent, and it is more likely in school-aged cohorts; nor have we interpolated mean values in order to create the appearance of a pure set. In addition, the measures in sequence accurately present the growth of specific children

across nine ages. In consequence, Figures 1 and 2 are representations of steady accretion in height and weight in vertical, percentile points.

Losing specific children caused particular age measures reported here to fluctuate in number, as Table 1 shows, but all measures are real. A positive aspect of tracing probands is that families moved all over the United States, and some lived briefly in Europe and Asia. Such families were not lost for purposes of measurement; and so the cohort lost its original identification with the St. Louis area and became national in the geographic if not quite demographic sense. Loss of subjects in the years covered by this report was generally due to lower class families moving as much as once a month. They disappeared and remained inaccessible until discovered living only a block or two away from the last known residence, at a later date, only to migrate once more.

Comparisons. For purposes of evaluating the central trends of the data by comparisons we draw on the norms published by the National Center for Health Statistics (Hammill et alii, 1977). In Table 2 are the NCHS fiftieth percentiles for height and weight by sex, and on either side on the investigation's cohort values by race for each sex. The NCHS data exclude height at the first three ages reported from the St. Louis cohort.

For height in males at six ages St. Louis white boys are slightly taller in all instances, and black boys are taller at all but age 84 months. In females at six ages white girls are shorter at the first four ages and taller at the last two ages. Black girls are taller at four ages seriatim, and shorter at two ages, 24 and 84 months. In general, the St. Louis boys and girls, black and white, tend to be taller than the NCHS standards of Hammill et alii (1977).

For weight at nine ages in males white boys are heavier except at age

36 months. Black boys are consistently heavier from age two years on. In females, white girls are heavier at all ages, and black girls are also heavier at all but the ninth age, 84 months. Black and white boys and girls in St. Louis are clearly heavier than the children represented in the NCHS data, and tend to be taller, but to a less overwhelming degree, than their NCHS counterparts. These comparisons suggest that separate norms by race are useful for height and weight, although the racial differences are not great, i.e., they are less than social class differences observed in the Nineteenth century (Jordan, 1986).

To assess annual increments in growth we incorporate in Tables 3 to 6 data reported by Krogman (1972), in which race is unspecified, and data on black children reported by Verghese et alii (1969).

Our mode of comparison is to count the frequency of having the highest, middle and lowest increment at each age span for the cohort children and one of two reference groups. When annual increments in male weights from birth to 84 months are examined Krogman's data tend to present the largest increments and black males the lowest. In the case of female weight increments Krogman's increments tend to be the largest with black females tending to be the lowest. In the case of height increments amongst males whites tend to larger values and blacks to the smallest. Among females, Krogman's subjects have the highest increments and white males the lowest. In general, the increments in the St. Louis children's height and weight are below those reported by Krogman.

When the Verghese et alii data from the District of Columbia are the basis for comparisons, beginning at age one year, we see that males' mean weight increments are lowest over the six years considered; values in Table 3 from cohort white males are similar to those for the Verghese et aliorum

children in the extent to which they have the heaviest weights. Cohort black children had the largest increments at no age, and the lowest at four ages. In general, the cohort white males' mean increments tended to be heaviest at any age and the cohort black males tended to have the lowest mean increments at several ages. In Table 4 female weight increments of cohort white girls and Verghese's girls had an equal frequency of the highest increment, and cohort black girls had the highest occurrence of the lowest increment among the three groups. The Verghese Philadelphia girls were least likely to have the lowest weight increment.

Turning to height in males, in Table 5, the pattern of annual increments is that the Philadelphia boys have the highest frequency of the greatest annual increment. The cohort black boys have the lowest incidence, and the cohort white boys have the preponderance of middle-band increments. For females, in Table 6, Verghese's black Philadelphia girls are most likely to have the largest height increment and cohort white girls are likely to have the lowest. Cohort black girls tend to fall between those two groups.

From these comparisons we see that the pattern of annual increments in weight and height against two reference groups tends to be highly heterogeneous. A way to explain this finding is to note differences in the four samples considered. However, the conclusion we suggest is that patterns of growth increments differ by race as well as by sex. Accordingly, norms should reflect both categorical variables. In the case of growth in body mass (h/w^2), the pattern in the four subgroups of children is essentially comparable; however, body mass indexes tend to be below those calculated from NCHS data presented by Hammill et alii (1977).

Within the St. Louis Baby Study males, white subjects tend to have larger height increments than black and, between females, black subjects

tend to have the higher height increments. In the case of weight white males have slightly larger increments than black subjects and in the case of girls, the weight increments tend to be similar. In general, the pattern of increments by sex and race shows that there are differences by race in weight and height. In this regard, we have shown elsewhere (Jordan, 1980) that social class, which is sometimes presented as a racial effect, is not an influence. Verghese et alii (1969) have reported that there are different patterns of growth in the lower extremities of children when of African descent due to the influence of the gene pool. Accordingly, development of norms by race seems appropriate and the data of this report tend to confirm their value.

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